

Claims

1. A supported catalyst system suitable for the polymerisation of olefins comprising

- (a) a transition metal compound,
- (b) a non-aluminoxane activator, and

5 (c) a support material comprising an inorganic metal oxide, inorganic metal halide or polymeric material or mixtures thereof

*characterised in that* the support material has been pretreated with an SO<sub>4</sub> containing compound.

2. A supported catalyst system according to claim 1 wherein the support material is  
10 silica.

3. A supported catalyst system according to either of the preceeding claims wherein the transition metal compound is a metallocene.

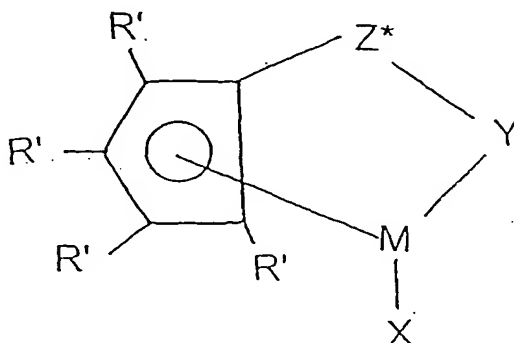
4. A supported catalyst system according to claim 3 wherein the metallocene has the formula:



wherein Cp is a single cyclopentadienyl or substituted cyclopentadienyl group optionally covalently bonded to M through a substituent, M is a Group VIA metal  
20 bound in a  $\eta^5$  bonding mode to the cyclopentadienyl or substituted cyclopentadienyl group, X each occurrence is hydride or a moiety selected from the group consisting of halo, alkyl, aryl, aryloxy, alkoxy, alkoxyalkyl, amidoalkyl, siloxyalkyl etc. having up to 20 non-hydrogen atoms and neutral Lewis base ligands having up to 20 non-hydrogen

atoms or optionally one X together with Cp forms a metallocycle with M and n is dependent upon the valency of the metal.

5. A supported catalyst system according to claim 3 wherein the metallocene is represented by the general formula:



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wherein:-

R' each occurrence is independently selected from hydrogen, hydrocarbyl, silyl, germyl, halo, cyano, and combinations thereof, said R' having up to 20 nonhydrogen atoms, and optionally, two R' groups (where R' is not hydrogen, halo or cyano) together form a divalent derivative thereof connected to adjacent positions of the cyclopentadienyl ring to form a fused ring structure;

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X is a neutral  $\eta^4$  bonded diene group having up to 30 non-hydrogen atoms, which forms a  $\pi$ -complex with M;

Y is -O-, -S-, -NR\*-, -PR\*-;

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M is titanium or zirconium in the + 2 formal oxidation state;

Z\* is  $\text{SiR}^*_2$ ,  $\text{CR}^*_2$ ,  $\text{SiR}^*_2\text{SiR}^*_2$ ,  $\text{CR}^*_2\text{CR}^*_2$ ,  $\text{CR}^*=\text{CR}^*$ ,  $\text{CR}^*_2\text{SiR}^*_2$ , or  $\text{GeR}^*_2$ , wherein:

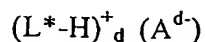
R\* each occurrence is independently hydrogen, or a member selected from hydrocarbyl, silyl, halogenated alkyl, halogenated aryl, and combinations thereof, said

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R\* having up to 10 non-hydrogen atoms, and optionally, two R\* groups from Z\* (when R\* is not hydrogen), or an R\* group from Z\* and an R\* group from Y form a ring system.

6. A supported catalyst system according to any of the preceeding claims wherein

the activator may be represented by the formula:



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wherein

$L^*$  is a neutral Lewis base

$(L^*-H)^+_d$  is a Bronsted acid

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$A^{d-}$  is a non-coordinating compatible anion of a Group IIIA metal or metalloid having a charge of  $d^-$ , and

$d$  is an integer from 1 to 3.

7. A supported catalyst composition according to claim 6 wherein the anion comprises a boron metal.

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8. A supported catalyst system according to claim 6 wherein the activator comprises a cation and an anion wherein the anion has at least one substituent comprising a moiety having an active hydrogen.

9. A supported catalyst system according to any of the preceeding claims wherein the  $SO_4$  containing compound is a transition metal sulphate.

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10. A supported catalyst system according to claim 9 wherein the transition metal sulphate is a sulphate of iron or copper.

11. A supported catalyst system according to claims 1 to 8 wherein the the  $SO_4$  containing compound is ammonium sulphate or sulphuric acid.

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12. A process for the polymerisation of olefin monomers selected from (a) ethylene, (b) propylene (c) mixtures of ethylene and propylene and (d) mixtures of (a), (b) or (c) with one or more other alpha-olefins, said process performed under polymerisation conditions in the presence of a supported catalyst system according to any of the preceeding claims.

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13. A process for the polymerisation of ethylene or the copolymerisation of ethylene and  $\alpha$ -olefins having from 3 to 10 carbon atoms, said process performed under polymerisation conditions in the present of a supported catalyst system according to claims 1 to 11.

14. A process according to claims 12 or 13 wherein the alpha-olefins are 1-butene,

1-hexene, 4-methyl-1-pentene and 1-octene.

15. A process according to claims 12 to 14 carried out in the gas phase.

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